Appendix C: Bull Trout Determination Matrix

Matrices for Livestock Grazing

Checklist- Environmental baseline and effects on relevant indicators for: Wilkins Island and Poison Butte Allotment - Daves Island Pasture
Subpopulation Watershed: Jarbidge River **Local Population watershed**: Dave Creek **Habitat**: **Focal**

Pathways Indicators	Population and Environmental Baseline			Effects of the Action				
	Criteria	Present Condition	Functionality (F/FR/FU/UK)	R	M	D	HA	P T
Subpopulation Characteristics Local Population Size:	F = Total pop. >2000 FR = Total pop. <2000 >1500 FU = Total pop <1500	A number of adult bull trout seen in Dave Creek in Sept 2001. Specific numbers of bull trout were not recorded, but less than 50 were seen.	FU					
Growth and Survival:	F = Adult/young ratio >.1 & <.1 extent habitat 70,000 square m; FR= adult/young ratio <.1or habitat <70,000 sq m; FU = adult/young ratio <.1 and habitat <70,000 sq m, and subpopulation is at very low numbers	No data	UK					
Life History Diversity/ isolation	F=Migratory form is present and subpopulation is close and connected to other spawning/rearing groups; FR=Migratory for is present, but not well connected to other spawning/rearing groups; FU=Migratory form is absent	Migratory, not well connected. On Sept 12, 2002 several bull trout >8 inches in length were observed in Dave Creek. Preliminary genetics indicate there is limited genetic exchange between Dave Creek and other Jarbidge tributaries.	FR					
Persistence and genetic integrity	Strong populations: >5	0 strong populations, Preliminary genetics data indicate 8 genetic subpopulations. Bull trout in Dave Creek are 1 of the 8 subpops.	FU					
Water Quality: Temperature	7 day average max (F<12^{O}C, FR 12-15^{O}C, FU >15^{O}C)	7 day ave. high temp. 15.2^{O}C, highest temp. 18.8^{O}C at (T47N R58E Sec 12 SENW) on Dave Creek. Thermal barrier present from July through August in most years.	FU	✔			**N**	Up
Sediment	F = % fines <20% surface fines ≤6mm or Natural conditions; FR = < natural to 75% of natural conditions; FU = <75% natural cond.	Dave Creek BLM lands (fines 37%) FS lands (fines 9%)	FR		✔		**Y**	Static

Chemical Contam./Nutrients:	F = Low levels FR = moderate levels UR = High levels	No known pollutant sources; Fecal coliform bacteria was 12 colonies/l (2002) in Dave Creek, Pasture rested since Nov 2001. No CWA 303d streams. No data on nitrogen	F		✔		**N**	Up
Habitat Access Physical Barriers	F = man made barriers present in watershed but allow upstream and downstream fish passage at all flows	1 man made barrier present (jeep trail in Dave Creek for 0.2 miles), but fish passage at all flows	F					
Habitat Elements Substrate Embeddedness (fines):	F=reach embeddedness <20%, FR = embeddedness 20-30% FU = reach embeddedness >30%	Embeddedness score indicates that the substrate is 50-75% embedded	FU		✔		**Y**	Static
Large Woody Debris:	F = LWD frequency at or exceeds observed natural (or attainable) conditions; FR = <natural but ≥75% natural conditions; FU= ≤75% of natural conditions	Comparable to R1/R4 data; Dave Creek: large woody debris 97.2 pieces/mi, Future large woody debris likely limited because aspen being replaced by Rocky Mountain juniper;	F					
Pool Frequency & Quality:	F = pool frequency 60 pools/mi, good cover, cool water; or at natural conditions. FR < natural but >75%; FU <75% natural conditions	Dave Creek: 149.5 pools/mi, LWD (>6" diameter) present in 12 of 17 pools, over hanging vegetation present in 11 of 17 pools, Over hanging vegetation averaged 1.6 m by 1.5 m; Undercut banks were present in 6 of 17 pools. Undercut banks averaged 1.9 m length by 0.6 m in depth	F		✔		**Y**	Static
Large Pools:	F= natural conditions 60% pools >0.5 m FR <natural but >75% FU < 75% natural cond	Lower reach 60% of pools had depth of 0.5 m. Upper reach 14% pools had depth of 0.5 m Pools ave. max depth 0.56 m; ave. pool size over 0.3 m deep 2.5 m X 1.2 m;	FR		✔		**Y**	Static
Off-Channel Habitat	F= Many backwaters, side channels, low energy areas; FR=some backwaters, etc., FU= few or no backwaters	Loss of beaver and subsequent failure of beaver dams (T47N, R58E, Sec. 12 NWSENW) reduced some off-channel habitat in this drainage (B type channel). Backwaters, side channels few. Natural mortality suspected.	FR					

Refugia:	F= Population strong and well established. FR= Population strength and distribution weak and connected to refugia, FU=neither the pop strength and distribution is strong nor is refugia available	Dave Creek pop likely less than 500 bull trout. Genetics indicate that it is isolated from other pops in the EF. Jarbidge drainage.	FU					
Channel Condition & Dynamics -- Wetted width/max Depth ratio:	F=w/d ratio ≥ natural condition; FR= Channel w/d ratio < to 75% of nat. cond.; FU >75% of nat cond.	R1/R4 data w/d ratios should be 5-9, Dave Creek: W/D ratio is 9.6 in protected areas, 16.4 crossing point near Morgan Draw confluence, W/D ratio19.1 in area where Dave Creek is in road.	FR some areas FU		✔		**N**	Up
Streambank condition:	F= Streambank meets or exceeds natural condition, FR Streambank < nat. cond >75% nat cond.; FU streambank <75% nat. cond.	R1/R4 data streambanks 85-95 percent stable. 25.6% of the banks were unstable in the reaches surveyed, 70.9% of the banks were vegetated and stable. 3.5% of banks were uncovered, but stable because of boulder/cobble banks.	FR	✔			**N**	Up
Floodplain connectivity:	F=Off channel areas are frequently linked to main channel hydrology, FR=Off channel habitats infrequently linked to main channel; FU= Off Channel habitat not linked.	Data collected during PFC assessments indicated that the floodplain was flooded in 1-3 year intervals. Off channel habitat limited by topography in some areas.	F					
Flow/Hydrology --Change in Peak/Base Flows:	F=Comparable to an undisturbed watershed; FR= Some evidence of altered peak flow/base flow and/or flow timing; FU=Pronounced changes in peak flow	No water is diverted from Dave Creek. One spring on private land at head of Morgan Draw (T47N R59E, Sec 30 SESESW) was developed for livestock water several years ago. Down cut (4-5 ft deep) in Morgan Draw indicates timing (duration) of flow is altered.	FR					

Drainage Network Increase (miles)	F=Minimal increases in active channel length correlated with human disturbance; FR= Low to moderate increase in active channel length correlated with human disturbance; FU Greater than moderate increase in active channel length.	Existing drainage networks include the livestock trail into Dave Creek and out Morgan Draw (Sec 12), the jeep trail into and out of Dave Creek on private land (Sec 24 & 25). A trail on FS lands [Three Day Creek Trailhead](T46N, R59E Sec 7 SWSW) did not show signs of OHV use in October 2002, however, the jeep trail (T46N, R58E, Sec 24) across Dave Creek to Sawmill Ridge showed evidence of 4x4 trucks and ATV's.	FR					
Watershed Conditions (RHCA road density):	F < 1 mi/square mile, no valley bottom roads; FR =1 -2.4 miles/square mile few valley bottom roads, FU >2.4 miles/square mile	Total road miles in watershed =13.33 miles; Watershed size = 12.1 square miles, Road density = 1.1 roads/square mile Valley bottom roads = 0.25 miles. OHV use has been noted crossing Dave Creek (T47N,R58E, Sec. 12 NWSENW); OHV and 4x4 truck crossing Dave Creek at (T47N, R58E, Sec 24 SESW) and scattered in uplands; OHV and 4x4 truck use crossing the Dave Creek headwaters (T46N, R58E, Sec 24 NENE)	FR					
Disturbance History (Equivalent Clearcut Area ECA %):	F= <15% ECA of entire watershed with no concentration of disturbance in unstable or potentially unstable areas, refugia, and/or riparian area ; FR=<15% ECA of entire watershed but disturbance concentrated in unstable areas, refugia, or riparian area, FU= >15% ECA of entire watershed and disturbance concentrated in refugia and/or riparian area	ECA <15%, areas of disturbance noted in refugia and riparian area. Small area on private land (T47N, R58E, Sec 24 SESESW) used by hunters for camping. Livestock use on BLM land left a 2.5 inch stubble height (November 2001) at T47N,R58E, Sec 12 NWSENW and use appeared higher on private land. In mid-October. Impacts in riparian area	FR					

Riparian Conservation Areas (LWD/Shade)	F=Provides adequate shade, LWD recruitment, habitat protection and connectivity in subwatersheds, refugia >80% intact, adequately buffer impacts on rangelands; FR=Moderate loss of connectivity, incomplete protection of habitats, refugia 70-80% intact and adequately buffer impacts on rangelands; FU= RCA are fragmented, poorly connected, and provide inadequate protection of habitat for sensitive aquatic animals, (<70% intact, refugia does not occur, percent similarity to potential natural community/composition is <25%	Large woody debris is adequate now but future recruitment will be reduced as Rocky Mountain juniper replaces aspen, willows, dogwood, and alder. Riparian herbaceous species would also be reduced. Refugia less than 70% intact and does not buffer impacts on rangelands. Livestock much more limited on BLM lands due to topography. Grazing use in uplands near 40%, higher (60%) in Morgan Draw.	FU		✔		**N**	Static
Disturbance regime (hazard/risk rating):	F=Natural processes are stable; FR=Events are localized that occur in several minor parts of the watershed, Resiliency of habitat to recover from environmental disturbance is moderate. FU= Frequent floods and drought produce highly variable and unpredictable flows, channel is simplified providing little hydrologic complexity. Natural processes are unstable.	Events occur in minor parts of the watershed Down cuts and rills are evident on livestock trails into Dave Creek and Morgan Draw						

Integration of Species and Habitat Conditions:	F=Habitat quality and connectivity among subpopulations are high. Migratory form is present. Disturbance has not altered channel equilibrium. Fine sediments and other habitat characteristics influencing survival or growth is consistent with pristine habitat. Population is fluctuating around equilibrium or growing. FR=Fine sediments, stream temperatures, or availability of suitable habitats have been altered, recovery to predisturbance conditions > 5 years. Subpopulation reduced in size, but reduction does not represent long-term trend. Connectivity occurs but habitats are more fragmented. FU= Cumulative disruption of habitat has resulted in a clear declining trend in subpopulation size. Under current management, habitat conditions will not improve within 2 generations (10years). Little or no connectivity remains among subpopulations.	Deep pools (>.5 m deep) in the upper portion of Dave Creek on BLM lands account for only 14% of the pools. Instream fines and water temperature are limiting bull trout habitat, distribution and population in Dave Creek subwatershed. Based upon data collected on FS lands fines should be <10%. Habitat and temperatures will not recover to predisturbance conditions within 2 generations with current management. Some connectivity remains.	FU		✔			Static

Status: Functioning Appropriately - F Functioning at Risk - FR Functioning at Unacceptable Risk - FU Unknown - UK
Effect: R - Restore: the action will result in a positive change in the indicator evaluated, M - Maintain: the action will have no effect on the status of the indicator evaluated; D - Degrade: the action will result in a negative change in the indicator evaluated; HA - Hinder Attainment, PT - Perceived trend if action is adopted; NA - Not applicable.
PJ: Professional Judgement

Checklist- Environmental baseline and effects on relevant indicators for: Poison Butte Allotment, West Nevada Strip and West Halogeton Pastures
Subpopulation Watershed: Jarbidge River **Local Population watershed**: East Fork Jarbidge River (excluding Dave Creek) **Habitat**: **Nodal**

Pathways Indicators	Population and Environmental Baseline			Effects of the Action				
	Criteria	Present Condition	Functionality (F/FR/FU/UK)	R	M	D	HA	P T
Subpopulation Characteristics Local Population Size:	F = Total pop. >2000 FR = Total pop. <2000 >1500 FU = Total pop <1500	Available data suggest that there are less than 1,500 bull trout in the headwaters streams of the East Fork Jarbidge River.	FU					
Growth and Survival:	F = Adult/young ratio >.1 & <.1 extent habitat 70,000 square m; FR= adult/young ratio <.1or habitat <70,000 sq m; FU = adult/young ratio <.1 and habitat <70,000 sq m, and subpoplation is at very low numbers	No data	UK					
Life History Diversity/ isolation	F=Migratory form is present and subpopulation is close and connected to other spawning/rearing groups; FR=Migratory for is present, but not well connected to other spawning/rearing groups; FU=Migratory form is absent	PJ. Fluvial bull trout have been observed in the lower reaches of East Fork of the Jarbidge, below Murphy Hot Springs. In October 11, 2001, no evidence of spawning was noted.	FR					
Persistence and genetic integrity	Strong populations: 0	Not strong (>2000 adults) populations, Preliminary genetics data indicate 8 genetic subpopulations.	FU					
Water Quality: Temperature	7 day average max (F<12^{O}C, FR 12-15^{O}C, FU >15^{O}C)	7 day ave. max temp. 24.1^{O}C highest temp 26.4^{O}C. near Murphy Hot Springs (about 1.5 miles north of the Idaho/Nevada state line). Water temperatures for the lower portion of the East Fork of the Jarbidge River exceed temperatures for bull trout from mid-June into September and state standard for cold water biota 20^{O}C.	FU		✔		**N**	Static

Sediment	F = % fines <20% surface fines ≤6mm or Natural conditions; FR = < natural to 75% of natural conditions; FU = <75% natural conditions.	R1/R4 stream data indicate instream fines are near the standard and natural condition data base for a similar size stream. E.F. Jarbidge % fines was 20.2% measured just up stream of Murphy Hot Springs. Above the draw where trailing occurs % fines dropped to 15.5%.	F		✔		**Y**	Down
Chemical Contam./Nutrients:	F = Low levels FR = moderate levels UR = High levels	No known pollutant sources; East Fork Jarbidge fecal coliform bacteria levels vary. Background levels are about 10-13 colonies/L upstream of Murphy Hot Spring and around 52 to 230 colonies/L downstream of the community. When livestock trail across the East Fork Jarbidge, fecal coliform rates spike to 1600 - 4400 colonies/L at the crossing point and 100 m downstream, respectively, but return to near background levels (10-20 colonies/l) within 24 hours. E.F. Jarbidge is not a CWA 303d stream.	F		✔		**Y**	Down
Habitat Access Physical Barriers	F = man made barriers present in watershed but allow upstream and downstream fish passage at all flows	3 bridges/no culverts present, fish passage at all flows	F					
Habitat Elements Substrate Embeddedness (fines):	F=reach embeddedness <20%, FR = embeddedness 20-30% FU = reach embeddedness >30%	Embeddedness in the E.F. Jarbidge varied from 31.5% to 40%	FU		✔		**Y**	Static
Large Woody Debris:	F = LWD frequency at or exceeds observed natural (or attainable) conditions; FR = <natural but ≥75% natural conditions; FU= ≤75% of natural conditions	R1/R4 data 48 pieces/mi; East Fork Jarbidge 30.9 pieces/mi of LWG. The habitat consists of black cottonwood with Rocky Mountain juniper increasing. A number of young cottonwood are present on the gravel bars. The low amount of large woody debris in a portion of the East Fork Jarbidge is in part due to locals removing snags to protect bridges in town and for firewood.	FU					

Pool Frequency & Quality:	F = pool frequency 60 pools/mi, good cover, cool water; or at natural conditions. FR < natural but >75%; FU <75% natural conditions	East Fork Jarbidge: 51.5 pools/mile. C channel, 6 of 10 pools contained LWD. 1 of 10 pools had overhanging veg. (ave. 11 m by 1.5 m); 1 of 10 pools had under cut banks (ave.08 m X 0.4 m). Pool quality is generally low. The low amount of overhanging vegetation and under-cut banks on the East Fork Jarbidge are due in part to historic use and a rain on snow event in the mid 1990's. A rain on snow event in this drainage in the mid 1990's scoured the channel. It is still recovering.	FR	✔			**Y**	Up
Large Pools:	F= natural conditions 60% pools >0.5 m FR <natural but >75% FU < 75% natural condition	45% pools>0.5. Large pool ave. max. depth 0.7 m, pool size over 0.3 m 7.7 m X 4.0 m ;	FU	✔			**Y**	Up
Off-Channel Habitat	F= Many backwaters, side channels, low energy areas; FR=some backwaters, etc., FU= few or no backwaters	C channel above Murphy Hot Springs has some side channels and low energy areas; North of Murphy Hot Spring off channel habitat reduced over natural conditions due to road in the floodplain. Some recent beaver use at the edge of the stream channel.	FR					
Refugia:	F= Population strong and well established. FR= Population strength and distribution weak and connected to refugia, FU=neither the pop strength and distribution is strong nor is refugia available	East Fork Jarbidge: refugia are located in portions of Slide, God's Pocket, Cougar, Fall and Dave Creeks in upper portions of the East Fork Jarbidge drainage. Following spawning fluvial bull trout likely are present through the late spring in the East Fork Jarbidge River.	FR					
Channel Condition & Dynamics -- Wetted width/max Depth ratio:	F=w/d ratio $\geq$ natural condition; FR= Channel w/d ratio < to 75% of nat. cond.; FU >75% of natural conditions	R1/R4 data w/d ratios should be 9-21, East Fork Jarbidge River: W/D ratio is 27.8. Number may reflect the impact of the rain on snow event in the mid 1990's. Bank modification has also occurred to a lesser degree on BLM lands from past grazing (degraded from natural condition).	FU	✔			**N**	Static

Streambank condition:	F= Streambank meets or exceeds natural condition, FR Streambank < nat. cond >75% nat cond.; FU streambank <75% nat. cond.	R1/R4 banks 85-90% stable. East Fork Jarbidge: 20% of the banks were unstable, 77.3% were covered stable. 2.7% uncovered stable.	FR		✔		**N**	Static
Floodplain connectivity:	F=Off channel areas are frequently linked to main channel hydrology, FR=Off channel habitats infrequently linked to main channel; FU= Off Channel habitat not linked.	Data collected during PFC assessments indicated that the floodplain was flooded in 1-3 year intervals. Below Murphy Hot Springs the road built in the floodplain forces the water to the other bank.	F					
Flow/Hydrology --Change in Peak/Base Flows:	F=Comparable to an undisturbed watershed; FR= Some evidence of altered peak flow/base flow and/or flow timing; FU=Pronounced changes in peak flow	Flows comparable to undisturbed watershed. Some water is removed for the Jim Bob Pipeline in a headwater tributary. This diversion is negligible on the E F Jarbidge water flows.	F					
Drainage Network Increase (miles)	F=Minimal increases in active channel length correlated with human disturbance; FR= Low to moderate increase in active channel length correlated with human disturbance; FU Greater than moderate increase in active channel length.	Existing drainage networks include the livestock trail across EF Jarbidge and up an unnamed draw.	FR					
Watershed Conditions (RHCA road density):	F < 1 mi/square mile, no valley bottom roads; FR =1 -2.4 miles/square mile few valley bottom roads, UR >2.4 miles/square mile	Total roads in watershed = 47.34. Watershed size≈ 85.4 sq miles. Road density ≈ 0.56 road miles/square mile. Valley bottom roads total ≈ 5.38 miles. Most of the valley bottom roads are from Murphy Hot Spring and down stream.	FR					
Disturbance History (Equivalent Clearcut Area ECA %):	F= <15% ECA of entire watershed with <u>no concentration</u> of disturbance in unstable or potentially unstable areas, refugia, and/or riparian area ; FR=<15% ECA of entire watershed but disturbance concentrated in unstable areas, refugia, or riparian area, FU= >15% ECA of entire watershed and disturbance concentrated in refugia and/or riparian area	ECA <15%, small areas of disturbance noted in riparian area. These are associated with cattle trailing (just south of Murphy Hot Springs) and recreation (camping/fishing) sites. The most heavily used camping areas were “hardened” in 2001.	FR					

Riparian Conservation Areas (LWD/Shade)	F=Provides adequate shade, LWD recruitment, habitat, connectivity in subwatersheds; refugia >80% intact, adequately buffer impacts on rangelands; FR=Moderate loss of connectivity, incomplete protection of habitats, refugia 70-80% intact, adequately buffer impacts on rangelands; FU= RCA are fragmented, poorly connected, provide inadequate protection of habitat for sensitive aquatic animals, (refugia <70% intact, % similarity to potential natural community/composition is <25%	East Fork of Jarbidge on BLM was rated as PFC upstream of Murphy Hot Spring. LWD is less than expected, probably due to locals cutting down trees to protect bridges and for firewood. Jarbidge Field Office does not sell firewood permits. On the old floodplain Rocky Mountain juniper is replacing cottonwood. Some point bars show signs of cottonwood recruitment. Downstream of Murphy Hot Springs the east bank has been impacted by the Jarbidge Road reducing the recruitment of LWD.	FR	✔			**N**	Up
Disturbance regime (hazard/risk rating):	F=Natural processes are stable; FR=Events are localized that occur in several minor parts of the watershed, Resiliency of habitat to recover from environmental disturbance is moderate. FU= Frequent floods and drought produce highly variable and unpredictable flows, channel is simplified providing little hydrologic complexity. Natural processes are unstable.	Events occur in minor parts of the watershed. Rilling is present on roads and road shoulders down the E.F. Jarbidge, toward Murphy Hot Springs and up to Wilkins Island. An erosion gully formed prior to 1976 near the road to Wilkins Island (T16S, R9E Sec 26 SESWNE). Some rills are present on the livestock trail to Wilkins Island. Livestock crossing location on the East Fork Jarbidge River is also used by ATV's, motorcycles, and 4x4 trucks. There is evidence of slight livestock use in the BLM portion of the E.F. Jarbidge at other than the crossing point. Horse use (probably from Murphy Hot Springs) was evident down stream of Murphy Hot Springs. A few cow pats were observed off Cougar Point in 1996, but grazing levels were slight (<20% use).	FR					

Integration of Species and Habitat Conditions:	F=Habitat quality and connectivity among subpopulations are high. Migratory form is present. Disturbance has not altered channel equilibrium. Fine sediments and other habitat characteristics influencing survival or growth is consistent with pristine habitat. Subpopulation would recover in 1 - 2 generations (5-10 years). Population is fluctuating around equilibrium or growing. FR=Fine sediments, stream temperatures, or availability of suitable habitats have been altered and will not recover to predisturbance conditions within 5 years. Subpopulation is reduced in size, but does not represent a long-term trend. Subpopulation is stable or fluctuating around a downward trend. Connectivity occurs but habitats are more fragmented. FU= Cumulative disruption of habitat has resulted in a clear declining trend in subpopulation size. Under current management, habitat conditions will not improve within (10years). Little or no connectivity remains among subpopulations.	The migratory form is evident. To date there is no information showing movements of fluvial bull trout between populations in the E F Jarbidge and Jarbidge watersheds. Data in the E.F. Jarbidge upstream of Murphy Hot Springs suggest fines are elevated compared to pristine habitat. Water temperatures in the summer (late June to early September) exceed those needed for bull trout rearing near Murphy Hot Springs, but headwater streams are cooler. A number of old cottonwood are still present, but young trees have not developed in the understory. Increasing Rocky Mountain junipers lack the height and provide less channel shading. Habitat and temperatures will not recover to predisturbance conditions within 2 generations with current management.	FR	✔			**N**	Up

Status: Functioning Appropriately - F Functioning at Risk - FR Functioning at Unacceptable Risk - FU Unknown - UK
Effect: R - Restore: the action will result in a positive change in the indicator evaluated, M - Maintain: the action will have no effect on the status of the indicator evaluated; D - Degrade: the action will result in a negative change in the indicator evaluated; HA - Hinder Attainment, PT - Perceived trend if action is adopted; NA - Not applicable.
PJ: Professional Judgement

Checklist- Environmental baseline and effects on relevant indicators for: Poison Butte and Inside Desert Allotments
Subpopulation Watershed: Jarbidge River **Local Population watershed**: Jarbidge River below confluence with E.F. Jarbidge **Habitat**: **Nodal**

Pathways Indicators	Population and Environmental Baseline			Effects of the Action				
	Criteria	Present Condition	Functionality (F/FR/FU/UK)	R	M	D	HA	P T
Subpopulation Characteristics Local Population Size:	F = Total pop. >2000 FR = Total pop. <2000 >1500 FU = Total pop <1500	Available data suggest that there are less than 1,500 bull trout in the headwaters streams of the Jarbidge River.	FU					
Growth and Survival:	F = Adult/young ratio >.1 & <.1 extent habitat 70,000 square m; FR= adult/young ratio <.1or habitat <70,000 sq m; FU = adult/young ratio <.1 and habitat <70,000 sq m, and subpopulation is at very low numbers	No data	UK					
Life History Diversity/ isolation	F=Migratory form is present and subpopulation is close and connected to other spawning/rearing groups; FR=Migratory for is present, but not well connected to other spawning/rearing groups; FU=Migratory form is absent	PJ. Fluvial bull trout have been observed in the lower reaches of E. and main stem of the Jarbidge. IDF&G have observed bull trout below the confluence of the E. F. Jarbidge. In October 11, 2001, no evidence of spawning was noted.	FR					
Persistence and genetic integrity	Strong populations: >5	No strong (>2000 adults) populations, Preliminary genetics data indicate 8 genetic subpopulations. The populations are split between the headwaters streams of the East Fork and Jarbidge River	FU					
Water Quality: Temperature	7 day average max (F<12^{O}C, FR 12-15^{O}C, FU >15^{O}C)	7 day ave. max. 27 ^{O}C (Aug 1994). The temperature was taken at a location just downstream of the confluence with the East Fork Jarbidge (T16S, R9E, Sec. 10 NENWSE).	FU					

Sediment	F = % fines <20% surface fines ≤6mm or Natural conditions; FR = < natural to 75% of natural conditions; FU = <75% natural cond.	Average 8% fines (from Warren and Partridge 1993). Range 1 to 17%. Fines are higher just down stream of the East Fork Jarbidge confluence but decline further down the stream as the distance from the roads increases. Phenomenon most likely related to sediment from roads (Warren and Partridge 1993).	F		✔		UK	UK
Chemical Contam./Nutrients:	F = Low levels FR = moderate levels UR = High levels	Data from 1982 had the following levels (ppm = parts per million) Nitrogen= 2.0, Sulfate=5.0, Organophosphate=<0.05, Pb=<0.05; Hg=<0.0005, Chloride=3.5, Fecal Coliform=50 organisms/100 ml, Fecal Strep 40 organisms/ 100 ml	F					
Habitat Access Physical Barriers	F = man made barriers present in watershed but allow upstream and downstream fish passage at all flows	None	F					
Habitat Elements Substrate Embeddedness (fines):	F=reach embeddedness <20%, FR = embeddedness 20-30% FU = reach embeddedness >30%	No Data	UK		✔		UK	UK
Large Woody Debris:	F = LWD frequency at or exceeds observed natural (or attainable) conditions; FR = <natural but ≥75% natural conditions; FU= ≤75% of natural conditions	R1/R4 data base 21 pieces/ mile. LWD 9.2 pieces/mile. The dominant tree is Rocky Mountain juniper. Willows and other shrubs are generally sparse.	FU					
Pool Frequency & Quality:	F = pool frequency 60 pools/mi, good cover, cool water; or at natural conditions. FR < natural but >75%; FU <75% natural conditions	No numerical pool data. Warren and Partridge (1993) provided % of habitat that was pools for 2 reaches 21% and 35.9%. Overall pools averaged 30.6% for the Jarbidge River.	UK					
Large Pools:	F= natural conditions 60% pools >0.5 m FR <natural but >75% FU < 75% natural conditions	No data	UK					
Off-Channel Habitat	F= Many backwaters, side channels, low energy areas; FR=some backwaters, etc., FU= few or no backwaters	Floodplain is confined in a deep narrow volcanic canyon and is naturally limited.	F					

Refugia:	F= Population strong and well established. FR= Population strength and distribution weak and connected to refugia, FU=neither the pop strength and distribution is strong nor is refugia available	Jarbidge River population is cut off from all other bull trout watersheds by dams along the Snake River. Population within the watershed is low.	FU						
Channel Condition & Dynamics -- Wetted width/max Depth ratio:	F=w/d ratio ≥ natural condition; FR= Channel w/d ratio < to 75% of nat. cond.; FU >75% of nat conditions.	R1/R4 data w/d ratios should vary between 10-42, Jarbidge w/d ratio 54 (calculated Warren and Partridge 1993)	FR						
Streambank condition:	F= Streambank meets or exceeds natural condition, FR Streambank < nat. cond >75% nat cond.; FU streambank <75% nat. cond.	R1/R4 data streambanks 85-95 percent stable. No data	UK		✔		No	Static	
Floodplain connectivity:	F=Off channel areas are frequently linked to main channel hydrology, FR=Off channel habitats infrequently linked to main channel; FU= Off Channel habitat not linked.	Data collected during PFC assessments indicated that the flooplain was flooded in 1-3 year intervals. Off channel habitat naturally limited by topography.	F						
Flow/Hydrology --Change in Peak/Base Flows:	F=Comparable to an undisturbed watershed; FR= Some evidence of altered peak flow/base flow and/or flow timing; FU=Pronounced changes in peak flow	Jarbidge has a community water system with its source being a spring in the Bear Creek Watershed. Murphy Hot Spring apparently is served by individual wells. Impact of water use by these communities on the base flow is unknown.	UK						
Drainage Network Increase (miles)	F=Minimal increases in active channel length correlated with human disturbance; FR= Low to moderate increase in active channel length correlated with human disturbance; FU Greater than moderate increase in active channel length.	No data	UK						
Watershed Conditions (RHCA road density):	F < 1 mi/square mile, no valley bottom roads; FR =1 -2.4 miles/square mile few valley bottom roads, UR >2.4 miles/square mile	Total roads in watershed = 49.9 Watershed size=110.3 sq miles. Road density = 0.45 miles road/square mile; Valley bottom roads = 0 miles.	F						

Disturbance History (Equivalent Clearcut Area ECA %):	F= <15% ECA of entire watershed with no concentration of disturbance in unstable or potentially unstable areas, refugia, and/or riparian area ; FR=<15% ECA of entire watershed but disturbance concentrated in unstable areas, refugia, or riparian area, FU= >15% ECA of entire watershed and disturbance concentrated in refugia and/or riparian area	Wild fires have burned >15% of the watershed area in the past 10 years. The most recent fire was in 1999, Disturbance has not been concentrated in riparian area.	FR					
Riparian Conservation Areas (LWD/Shade)	F=Provides adequate shade, LWD recruitment, habitat protection and connectivity in subwatersheds, refugia >80% intact, adequately buffer impacts on rangelands; FR=Moderate loss of connectivity, incomplete protection of habitats, refugia 70-80% intact and adequately buffer impacts on rangelands; FU= RCA are fragmented, poorly connected, and provide inadequate protection of habitat for sensitive aquatic animals, (<70% intact, refugia does not occur, percent similarity to potential natural community/composition is <25%	Rocky Mountain junipers provide little shade for the Jarbidge River due to their relatively short stature and shape. The Jarbidge River is likely used only as nodal habitat following spawning through early June. Large woody debris is limited. Maximum water temperatures are >15^{O}C beginning in late June through early September.	FR					
Disturbance regime (hazard/risk rating):	F=Natural processes are stable; FR=Events are localized that occur in several minor parts of the watershed, Resiliency of habitat to recover from environmental disturbance is moderate. FU= Frequent floods and drought produce highly variable and unpredictable flows, channel is simplified providing little hydrologic complexity. Natural processes are unstable.	The roads upstream of the confluence of the East Fork Jarbidge and West Fork Jarbidge are a constant source of sediment. Channels restricted by the roads increase water velocity and reduce the habitat available to produce large woody debris and off channel habitat. Poison Creek, an ephemeral stream, produces pulses of sediment into the Jarbidge River when it runs. Water flows in Poison Creek about 1 in 5-7 years. Other major drainages include Cougar, Columbet, and Dorsey Creeks.	FR					

Integration of Species and Habitat Conditions:	F=Habitat quality and connectivity among subpopulations are high. Migratory form is present. Disturbance has not altered channel equilibrium. Fine sediments and other habitat characteristics influencing survival or growth is consistent with pristine habitat. Subpopulation would recover in 1 - 2 generations (5-10 years). Population is fluctuating around equilibrium or growing. FR=Fine sediments, stream temperatures, or availability of suitable habitats have been altered and will not recover to predisturbance conditions within 5 years. Subpopulation is reduced in size, but reduction does not represent a long-term trend. Subpopulation is stable or fluctuating around a downward trend. Connectivity occurs but habitats are more fragmented. FU= Cumulative disruption of habitat has resulted in a clear declining trend in subpopulation size. Under current management, habitat conditions will not improve within 2 generations (10 years). Little or no connectivity remains among subpopulations. Subpopulation responds sharply to normal environmental events.	Partridge (pers comm.) observed bull trout on 1 occasion downstream of the East Fork Jarbidge confluence. Old Idaho Fish & Game data indicate that the fluvial form is occasionally present even in the Bruneau River. This would be consistent with bull trout movements from Rapid River into the Salmon River. Water temperatures are too warm in the main stem of the Jarbidge from mid June into September to provide year round habitat for bull trout. Water temperatures are elevated prior to reaching the main stem of the Jarbidge River. Rocky Mountain junipers throughout the canyon generally do not provide shade or large woody debris for habitat.			✔		UK	UK

Status: Functioning Appropriately - F Functioning at Risk - FR Functioning at Unacceptable Risk - UR Unknown - UK

Effect: R - Restore: the action will result in a positive change in the indicator evaluated, M - Maintain: the action will have no effect on the status of the indicator evaluated; D - Degrade: the action will result in a negative change in the indicator evaluated; HA - Hinder Attainment, PT - Perceived trend if action is adopted; NA - Not applicable.

PJ: Professional Judgement